GRIP STRIP AND METHOD OF MAKING THE SAME

BACKGROUND OF THE INVENTION

1. Field of the invention:

The present invention relates to grip strips and, more particularly, to a grip strip fabrication method to make a grip strip by preparing a substrate sheet from a first polymer and then coating or dipping the substrate sheet with a second polymer.

2. Description of the Related Art:

A grip strip is a strip to be wound round the handle of an apparatus, for example, tennis or badminton racket, golf club, kick scooter, bicycle, etc. Elastic materials, such as polyurethane (PU), Ethylene Vinyl Acetate (EVA), etc., are commonly used for making grip strips for the advantages of anti-slip, shock absorbing, and breathing.

A popularly used grip strip is comprised of a foamed EVA substrate and a PU covering attached on the surface of the foamed EVA substrate by glue and/or double-sided adhesive tape (the substrate may be embedded with a layer of non-woven fabric). Thus, the outer PU covering achieves the desired anti-slip function, and the EVA substrate achieves the desired shock-absorbing function (there are known grip strips that have the PU covering disposed at the inside and the EVA substrate disposed at the outside). Other polymers of similar physical properties may be used for making grip strips.

According to conventional designs, the thickness of a grip strip is the combined thickness of the substrate and the covering (and the added backing layer or reinforcing layer if any). If the EVA substrate and the PU covering commonly have the thickness of 1mm, the thickness of the finished grip strip must be 2mm. Therefore conventional grip strips are commonly thick. When wound round the handle of an apparatus, the grip strip does not cause a sense of beauty (if making the substrate and the covering thinner during fabrication, the finished grip strip cannot provide the desired elastic and shock-absorbing

power). Further, grip strips made according to the prior art methods commonly use much material, resulting in a high manufacturing cost. The side-to-side bonding between the substrate and the covering cannot tightly secure the substrate and the covering together, and the two materials may easily be separated from each other from the border area.

SUMMARY OF THE INVNEION

The present invention has been accomplished under the circumstances in view. It is the main object of the present invention to provide a grip strip fabrication method, which keeps the substrate and the coating material tightly bonded together without affecting the physical properties of the materials used.

It is another object of the present invention to provide a grip strip fabrication method, which reduces the consumption of materials and the manufacturing cost.

It is still another object of the present invention to provide a grip strip fabrication method, which minimizes the thickness of the grip strip without affecting the physical properties of the materials used.

To achieve these objects of the present invention, the grip strip fabrication method comprises the steps of: (a) preparing a substrate sheet made from a fist material, the substrate sheet having a plurality of through holes through top and bottom sides thereof, the first material being a polymer; (b) dipping or coating the substrate sheet with a melt second material such that the through holes of said substrate sheet are filled up and at least one of the top and bottom sides of the substrate sheet is covered by the second material, the second material being a polymer different from the first material; and (c) hardening the second material-covered substrate sheet.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a grip strip fabrication flow according to the first embodiment

of the present invention.

FIG. 2 is a perspective view of a meshed net member prepared during the first step according to the first embodiment of the present invention.

FIG. 3 is a perspective view of a substrate sheet produced after the second step according to the first embodiment of the present invention.

FIG. 4 is a perspective view of a semi-finished grip strip produced after the third step according to the first embodiment of the present invention.

FIG. 5 is a sectional view taken along line 5-5 of FIG. 4.

FIG. 6 is a sectional view of a grip strip made according to the second embodiment of the present invention.

FIG. 7 illustrates a grip strip fabrication flow according to the second embodiment of the present invention.

FIG. 8 is a schematic view showing the action of the third step according to the third embodiment of the present invention.

FIG. 9 is a perspective view of a semi-finished grip strip produced after the fourth step according to the third embodiment of the present invention.

FIG. 10 is a sectional view taken along line 10-10 of FIG. 9.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. 1, a grip strip fabrication method in accordance with the first embodiment of the present invention includes the steps of (a) preparing a meshed net member, (b) dipping the meshed net member in a foamable melt first material and then foaming the first material-coated meshed net member into a substrate sheet, (c) coating the substrate sheet with a second material to form a semi-finished grip strip when hardened, and (d) processing the semi-finished grip strip into a finished grip strip. These steps are described hereinafter in detail.

(a) As illustrated in FIG. 2, a meshed net member **10** formed of interwoven warp

threads **12** and west threads **14** is firstly prepared. The warp threads **12** and the west threads **14** can be obtained from natural fibers, synthetic fibers, polymers, or metal. According to the present embodiment, the meshes **16** of the meshed net member **10** are orderly arranged in an array, having a rectangular shape of size about 5×4mm.

(b) The meshed net member **10** thus obtained is dipped in a foamable melt first material, causing the warp threads **12** and the weft threads **14** to be evenly coated with a layer of the first material. According to this embodiment, the first material is EVA (Ethylene Vinyl Acetate). The EVA coating is then foamed. After foaming, a substrate sheet **20** is obtained (see FIG. 3). The substrate sheet **20** has a plurality of through holes **22** through the two opposite sides. According to this embodiment, the substrate sheet **20** has a meshed structure of thickness about 1mm. The through holes **22** have an oval shape. The major axis and minor axis of the through holes **22** are about 4mm and 3mm respectively. The pitch between each two adjacent through holes **22** is about 1mm.

(c) A stripping film (not shown; it is a smooth film commonly used in conventional grip strip fabrication methods) is attached to the bottom side of the substrate sheet **20**, and then the top side of the substrate sheet **20** is coated with a layer of the second material, which is melted and fills up the through holes **22** of the substrate sheet **20**, and then the top side (the coating of the second material) is flattened (this can easily be achieved by means of providing a scraper above the conveyer delivering the substrate sheet). According to the present embodiment, the second material is PU (Polyurethane). By means of PU's physical properties, the second material is tightly bonded to the substrate sheet **20** (EVA). After hardening of the second material (PU), the stripping film is removed from the substrate sheet **20**, and therefore a semi-finished grip strip **50** is thus obtained, as shown in FIG. 4.

As shown in FIG. 5, the grip strip **50** comprises a substrate sheet **20**, which is made from the aforesaid first material (EVA) and has through holes **22** through its two

opposite sides, and a coating **30** obtained from the aforesaid second material (PU) and fixedly bonded to the substrate sheet **20** by coating on one side of the substrate sheet **20** and filling up the through holes **22**. According to the present embodiment, the substrate sheet **20** contains a meshed net member **10**, which reinforces the structural strength and stretching resilience of the substrate sheet **20**.

(d) Basically, the aforesaid semi-finished grip strip **50** can be used as a grip strip (with the side of the coating material **30** facing the outside). In actual practice for commercialization, the semi-finished grip strip **50** must receive certain processing processes. These processing processes include: cutting the semi-finished grip strip **50** into individual grip strips subject to the desired width (the semi-finished grip strip **50** may be a strip of width about several times of the desired width), beveling the long sides of each individual strip (so that the finished grip strip can be wound round a device handle smoothly), embossing or stamping the surface of each individual grip strip to form a design, grinding each individual grip strip to coarsen the surface, and adhering a backing layer to the bottom side of each individual grip strip.

A grip strip made according to the aforesaid fabrication method has the physical properties of the first material (EVA) and the second material (PU), i.e., the properties of comfort gripping, anti-slip, and shock absorbing. In comparison to a conventional grip strip having two layers of different materials bonded together, a grip strip made according to the present invention has a relatively thinner thickness and consumes relatively fewer amounts of materials. Therefore, a grip strip made according to the present invention is good for application and has a relatively low manufacturing cost. Further, because the substrate and the coating material are interconnected with each other, they are tightly bonded together and will hardly separate from each other.

The aforesaid description is simply one example of the present invention. The materials used in the aforesaid embodiment of the present invention, i.e., EVA and PU are

commonly used in conventional grip strips. Other polymers may be used to substitute for EVA and/or PU. The aforesaid substrate sheet **20**, which is formed by dipping the meshed net member **10** in the first material and then proceeding to the foaming process, is a meshed structure of high resilience. In actual practice, other methods may be employed to make the desired substrate sheet. For example, directly punching through holes on a flat sheet member. There are no strict limitations on the shape, size and distribution of the through holes at the substrate sheet. Any arrangement of through holes that allow the second material to be evenly coated on the net member is acceptable. Further, the coating **30a** may be coated on the both sides of the substrate sheet **20a**, enhancing the bonding between the coating material and the substrate. According to this alternate form, the both sides of the grip strip are identical for convenient use. When making the grip strip shown in FIG. 6, the substrate **20a** is dipped in the melt second material, and then second-material-coated substrate is set in shape from both sides.

As stated above, a backing layer may be bonded to the bottom side of the semi-finished grip strip to form any of a variety of grip strips. For example, a piece of non-woven fabric may be bonded to the back side of the semi-finished grip strip, and then the two long sides of the non-woven fabric-bonded semi-finished grip strip are beveled.

FIG. 7 indicates the third embodiment of the present invention. According to this embodiment, the grip strip fabrication method includes the steps of (a) preparing a meshed net member, (b) dipping the meshed net member in a melt first material and then foaming the first material-coated meshed net member into a substrate sheet, (c) attaching a sheet of backing material to the bottom side of the substrate sheet, (d) coating the top side of the substrate sheet with a melt second material to form a semi-finished grip strip when hardened, and (d) processing the semi-finished grip strip into a finished grip strip. According to this embodiment, steps (a) and (b) are same as the aforesaid first embodiment. Step (c) is outlined hereinafter with reference to FIG. 8. After fabrication of a substrate

sheet **20'** having through holes **22'**, put the substrate sheet **20'** on the top side of a non-woven backing material **40**, and then coat the top side of the substrate sheet **20'** with a layer of the melt second material for enabling the through holes **22'** to be filled with the second material and bonded to the non-woven backing material **40**, and thus a semi-finished grip strip **50'**, as shown in FIGS. 9 and 10, is obtained when the second material is hardened. Because the second material is directly bonded to the non-woven backing material **40** when covered on the top side of the substrate sheet **20'**, this embodiment eliminates the procedure of bonding the backing material to the substrate.